

# Testicular Vein Syndrome and Its Treatment with a Laparoscopic Approach

Nand Kishore Arvind, Onkar Singh, Shilpi Singh Gupta

## ABSTRACT

**Background and Objectives:** Testicular vein syndrome (TVS) is a rare cause of ureteral obstruction. Only 5 previous cases are on record in the literature, and no review exists on this topic to date. Laparoscopic treatment has never been mentioned in the management of TVS.

**Materials and Methods:** We reviewed the literature related to this unusual entity to clarify the preoperative evaluation and the management of TVS. For this purpose, the data related to all the 5 cases previously reported so far in the English literature have been reviewed. Also, we report the sixth case of TVS, and the first patient to be successfully treated with the laparoscopic approach. This was a 37-year-old male with a 6-month history of left loin pain. Preoperative diagnosis was confirmed by CT-Urography.

**Results:** Our patient underwent laparoscopic excision of the left testicular vein followed by ureteroureterostomy in a single sitting. The laparoscopic transperitoneal approach was used. Histopathological examination of the vein showed normal venous tissue. This is the sixth reported case of TVS and the first to be successfully treated with a laparoscopic technique.

**Conclusions:** A laparoscopic approach is safe and effective for treating patients with TVS with the common advantages of minimal invasiveness and better visualization of the complex anatomy of the retroperitoneum. Thus, it should be the treatment of choice for TVS.

**Key Words:** Ureteral obstruction, Testicular vein syndrome, Laparoscopy.

## INTRODUCTION

Testicular vein syndrome (TVS) is a rare cause of ureteral obstruction that is largely unknown. Only 5 cases are on record in the English literature.<sup>1-5</sup> The cause of obstruction to flow of the urine is compression of the ureter by crossing of the testicular vein on either side. Treatment thus includes transection/excision of the involved part of the vein with or without ureteroureterostomy.<sup>1-3</sup> We here describe the first case of TVS treated successfully with the laparoscopic approach. All the previous reported cases have been reviewed in detail. Comparisons have been made at relevant points to its so-called counterpart, ovarian vein syndrome (OVS).

## MATERIALS AND METHODS

The literature related to TVS in particular is being reviewed in terms of presentation of all the previously reported cases in the English literature, their preoperative evaluation and management (**Table 1**).<sup>1-6</sup> A similar case treated successfully with the laparoscopic approach at our center is herein described in detail.

## CASE REPORT

A 37-year-old male presented with a 6-month history of left loin pain. The pain was dull in nature and not associated with any other complaint. He had not undergone any abdominal surgery and was otherwise healthy. He denied having a previous history of stones, urinary tract infection, or hematuria. Physical examination was unremarkable. Routine and microscopic examination of the urine and serum creatinine (0.8 mg/dL) were normal. Ultrasonography (USG) of the abdomen revealed mild-to-moderate left hydronephrosis (HDN) and dilatation of the proximal ureter suggestive of upper ureteral obstruction, but no calculus. Intravenous urography (IVU) showed mild HDN on the left side with dilatation of the proximal segment of the ureter up to the level of the third lumbar (L<sub>3</sub>) vertebra (**Figure 1**). No radio-opaque shadow was seen on IVU. Left retrograde pyelography (RGP) revealed the normal size of the lower and mid ureter, and dilation of the pelvicaliceal system and the upper ureter proximal to an abrupt narrowing at the level of the L<sub>3</sub> vertebra.

Department of Urology, Bhopal Memorial Hospital & Research Centre, Bhopal, 462038, India (Drs. Arvind, Singh, Gupta).

Address correspondence to: Dr. Onkar Singh, Department of Urology, Bhopal Memorial Hospital & Research Centre, Bhopal, 462038, India. Telephone: +91-9893777321, E-mail: dronkarsingh@gmail.com

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**Table 1.**  
Details of the Cases of Testicular Vein Syndrome Reported in the Literature

S. No.	Author/Year	Age of the Patient	Affected Side	Changes in the Offending Testicular Vein	Management
1.	Mellin et al, <sup>1</sup> 1975	28 Years	Right	Yes, Enlarged in size	Transection of the obstructing testicular vein
2.	Kretkowski et al, <sup>2</sup> 1977	–	Left	Yes, Features of thrombophlebitis present	Excision of the involved venous segment with ureterolysis followed by uretero-ureterostomy
3.	Lassnig et al, <sup>3</sup> 1978	Young adult	Left	Yes, Pathologically altered	Transection of the obstructing testicular vein
4.	Meyer et al, <sup>4</sup> 1992	42 Years	Right	None	–
5.	Ugurel et al, <sup>5</sup> 2005	54 Years	Right	Not mentioned	Conservative, follow-up with renal-USG and nuclear scintigraphy
6.	Gupta et al, <sup>6</sup> 2001	37 Years	Left	No change, Normal size. Grossly- normal. Microscopically- normal venous tissue, no signs of inflammation	Right PCN followed after few days by laparoscopic transection of the obstructing testicular vein with ureterolysis followed by uretero-ureterostomy

While performing the RGP a “jet effect” of the contrast, which is typical of the ureteropelvic junction obstruction, was observed. We planned for a left percutaneous nephrostomy (PCN) and subsequently a computerized tomography (CT) scan. The PCN tube started draining 1500mL to 1800mL of urine daily.

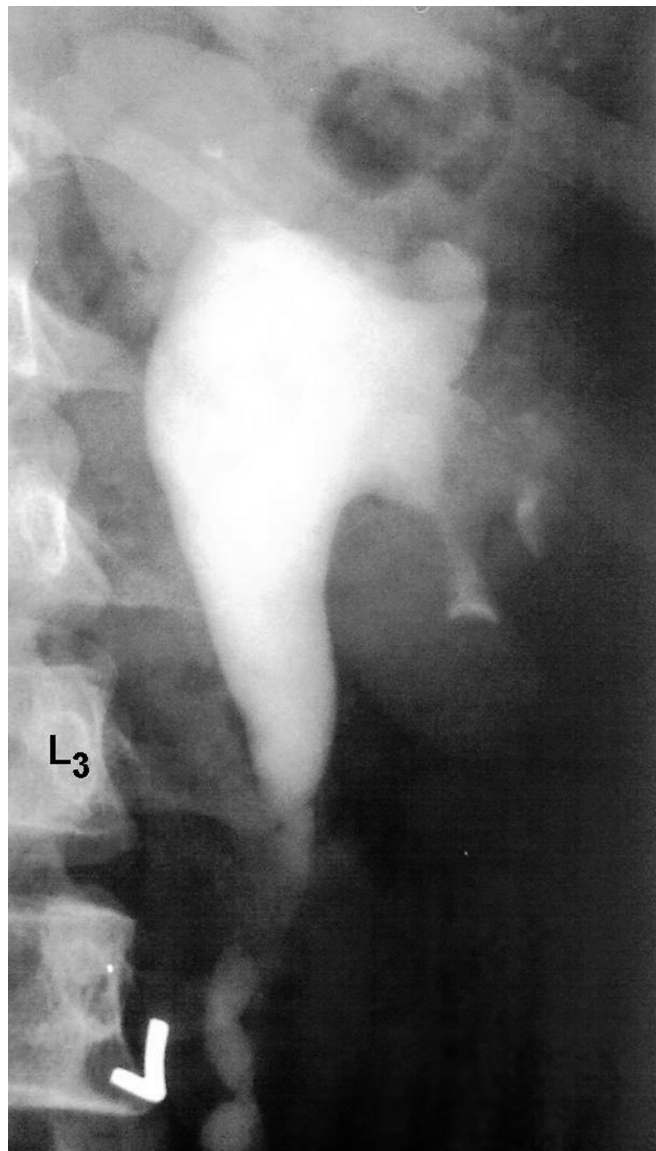
A CT-urography was performed that confirmed the findings of IVU and RGP. Images during the intravenous phase of the contrast-enhanced CT revealed mild left HDN and proximal hydroureterosis (**Figure 2A**), because of anterior compression of the left ureter by a vascular structure (**Figure 2B**). Careful review of the CT images during different phases of the examination revealed that it was the left testicular vein that was crossing-over anterior to the left ureter at the level of the L<sub>3</sub> vertebra. The patient was scheduled for laparoscopic excision of the testicular vein and if needed intraoperatively, ureteroureterostomy.

For a laparoscopic procedure, the patient was positioned in a 45° oblique position. A standard 3-port (12-mm camera port, and two 5-mm ports; **Figure 3**) transperitoneal laparoscopic approach was used. The left ureter was identified in the retroperitoneum. The left testicular vein was seen crossing the left upper ureter anteriorly from lateral to medial. The vein was noted to cause compression of the ureter, because only the ureteral segment proximal to the crossing point of the vein was dilated and had a normal caliber distal to this point (**Figure 4A & B**). No additional periureteral pathology or crossing vessels were identified. The testicular vein was dissected from the ureter,

ligated, and divided (**Figure 4B**). Although the compressed segment of the ureter appeared free of intrinsic obstruction, it appeared atretic. Therefore, the decision to perform ureteroureterostomy was made. The atretic segment was excised. Both the ends of the ureter were spatulated and anastomosed with Vicryl 4-0 suture by using an intracorporeal suturing technique. At the end, a closed drain was left in the area. No intraoperative or postoperative complications occurred. The patient's symptoms were relieved in the immediate postoperative period. He was discharged on the third postoperative day. He has remained asymptomatic since then. IVU after 3 months showed just mild fullness of the left pelvicaliceal system. At 4 months of follow-up, a radionuclide renal scan showed adequate function and excretion of the tracer.

## DISCUSSION

Different vascular anomalies can cause ureteric obstruction by external pressure. Among these, lower pole crossing vessels at the ureteropelvic junction (UPJ) are the most common cause. Similarly, retrocaval ureter is another such anomaly that develops because of aberrant development of the inferior vena cava (IVC).<sup>6</sup> Ovarian vein syndrome (OVS) is yet another rare syndrome that occurs in females because of obstruction of the ureter and resulting hydronephrosis due to an enlarged and frequently thrombosed ovarian vein.<sup>7</sup> Unlike OVS in which a pathologically altered (inflamed/enlarged/thrombosed) ovarian vein is usually the cause of the ureteral obstruction,<sup>8</sup> little is known regarding TVS. Except



**Figure 1.** Intravenous urography (IVU) shows mild left hydronephrosis with dilatation of the proximal ureter up to the level of the third lumbar vertebra (L3), and lesser passage of the contrast distal to the level of obstruction.

for crossing vessels at UPJ, retrocaval ureter, and OVS, the other vascular causes of extrinsic compression of the ureter are frequently overlooked. Proximal ureteral obstruction resulting in hydroureteronephrosis (HUN), because of normal testicular vein crossing in front of the ureter on either side is one such unusual example.

Venous drainage of the testes is done through the pampiniform plexus, which forms the testicular vein near the deep inguinal ring. The right testicular vein drains into the IVC at

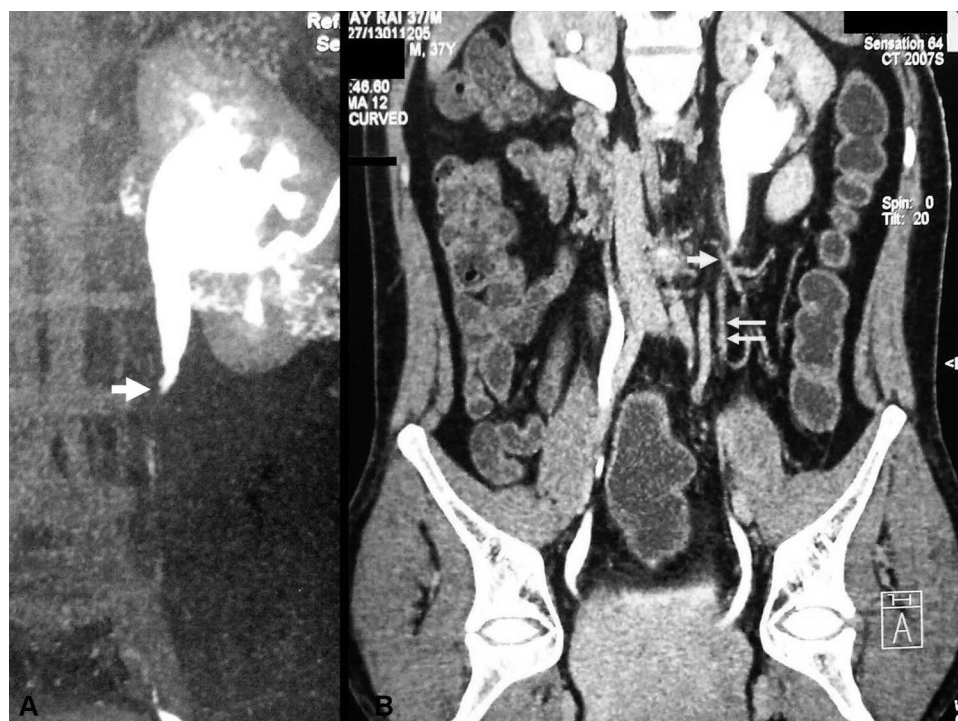
an oblique angle, while the left testicular vein drains into the corresponding renal vein at a straight angle. The right and left testicular veins cross the corresponding ureters anteriorly at the level of the third lumbar vertebra.<sup>1-4,9</sup>

Although OVS is rare, since it was first reported in 1964 many case reports and series of OVS have been published, and today it is considered a well-described entity in the literature.<sup>8,10,11</sup> However, Mellin et al<sup>1</sup> in 1975 reported the first case of its own kind in a male patient where an enlarged right testicular vein with an atypical course was the cause of HUN. After 2 years, Kretkowski et al<sup>2</sup> described another similar case in which the left testicular vein that was enlarged due to thrombophlebitis was found as the cause of proximal ureteric obstruction resulting in HUN. From the findings of their case, they suggested the possibility of a male counterpart of OVS seen in females, and coined the term “testicular vein syndrome” (TVS).<sup>2</sup> However, since Kretkowski et al<sup>2</sup> reported the second case of TVS, only 3 more cases have been added to the literature.<sup>3-5</sup> We have herein described another such case of TVS that was successfully treated with the laparoscopic approach, a considerable step forward in its management, along with review of all the previously reported cases in the literature.

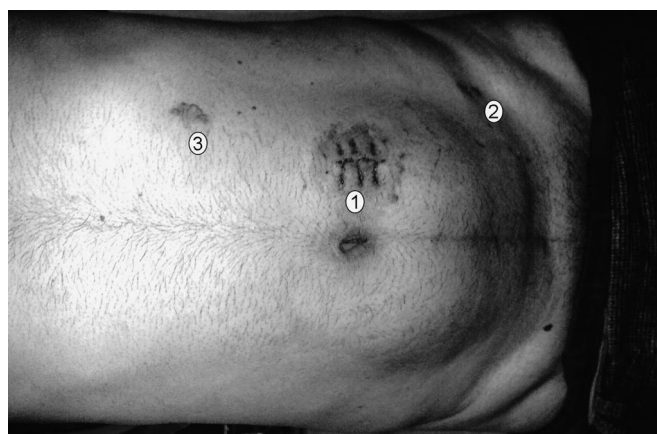
Three cases out of a total of 5 cases of TVS reported so far had been reported and written about from a urologist's prospective. However, the literature comprising these 3 cases is more than 30 years old.<sup>1-3</sup> For the other 2 cases, although they were recently reported, the main emphasis of the authors was on radiographic findings.<sup>4,5</sup> **Table 1** elaborates the details of the so far reported cases of TVS in the literature.<sup>1-5</sup> Mean age of presentation was around 40 years. TVS also differs from OVS in some aspects. First, unlike OVS, no right-sided predilection has been found in TVS.<sup>1-5</sup> Second, in half (50%) of the reported cases of TVS, the offending spermatic vein was not pathologically altered,<sup>1-5</sup> while it is usually so in cases of OVS.<sup>7</sup> The ureteral obstruction due to compression by the testicular vein usually presents with common symptoms of dull and intermittent loin pain with or without microscopic hematuria.

A preoperative diagnosis of TVS can be stated only after other common causes of ureteral obstruction have been ruled out. As in our case, the patient should be evaluated by USG and IVU to confirm or exclude the underlying cause of HUN. Contrast enhanced computerized tomography (CECT) shows the culprit vessel compressing the ureter from its anterior aspect usually at the level of the third lumbar vertebra on the right side and a little higher on the left side.<sup>4</sup> HUN proximal to the point of the crossing vessel can be easily recognized. The ureter is normal size distal to the crossing





**Figure 2.** Intravenous contrast-enhanced CT-urography. (A) Volume randomized tomography image during the excretory phase reveals mild left hydronephrosis with dilatation of the proximal ureter up to the level of an abrupt narrowing in caliber (white arrow), and poor passage of the contrast into the ureteral segment distal to the obstruction. (B) Paracoronal section during the excretory phase combined with predominant venous phase shows compression of the left ureter by a vascular structure crossing anteriorly (single yellow arrow). Below the level of obstruction, the caliber of the left ureter is normal (double yellow arrow).

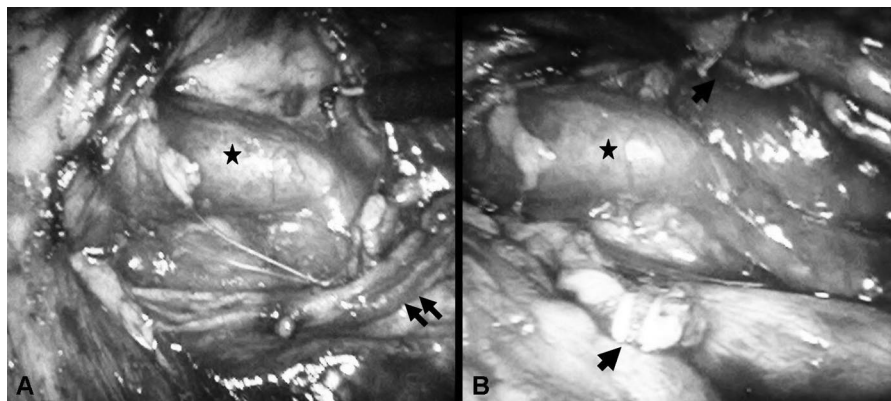


**Figure 3.** The port placement for laparoscopic treatment of left TVS. The numbers in the circles (below each port site) depict the order of insertion of the port at that site.

point provided there is no distal obstruction. Ugurel et al<sup>5</sup> have recently described multidetector-row computerized tomography (MDCT) findings in a case of right TVS. MDCT has the abilities of 3-dimensional visualization.<sup>12</sup> It has also been

applied in the techniques of CT-urography and CT-angiography (especially in the venous phase) that may be used singly or combined, and are really valuable in the diagnosis and treatment plan of extrinsic ureteral obstruction due to vascular compression.<sup>5,12</sup> If the diagnosis is still not certain, a jet effect of the contrast seen on RGP (as in our case) may point towards the diagnosis of TVS. A jet effect is typically seen in UPJ obstruction, but in TVS the level of obstruction is usually the L<sub>3</sub> vertebra.

Classically, TVS has been treated by transection or excision of the segment of the spermatic vein that is compressing the ureter, with or without ureterolysis.<sup>1-3</sup> This has been performed with the open approach. Further, although successful pure laparoscopic transperitoneal or retroperitoneal and robot-assisted laparoscopic approaches have been described for OVS,<sup>10,11,13,14</sup> such a minimally invasive approach has yet to be shown to be effective and safe for TVS. We believe that the main reason for this is the extreme rarity of this clinical entity and thus the paucity of cases. Further, one report of improvement in symptoms of TVS with conservative treatment is also available. This patient had mild symptoms because of partial obstruction.<sup>5</sup>



**Figure 4. A & B.** Intraoperative photographs of laparoscopic treatment of left TVS (Right hand side of the images is the cephalic, and left hand side is caudal of the patient); (A) The left testicular vein crossing anterior to the left ureter (double arrow) causing compression of the underlying ureter resulting in dilatation of its proximal segment (\*). (B) The left testicular vein has been ligated with vascular clips, cut and its proximal and distal ends (upper and lower single arrows) have been separated to show the compressed segment of the left ureter.

In our case, we decided to perform laparoscopic excision of the testicular vein, followed by ureteroureterostomy. Our decision was based on many factors. First, the preoperative diagnosis of left TVS was almost certain. Second, the laparoscopic approach allows detailed assessment of the anatomical relationships of the ureter in the deep-seated area of interest in the retroperitoneum. Also, if intraoperatively, pyeloplasty had been chosen, it could have been easily performed through the laparoscopic approach.

## CONCLUSION

TVS is an extremely rare entity that should be regarded as a diagnosis of exclusion. The available literature has been reviewed along with the first report of successful treatment of TVS with the laparoscopic approach at our center. The laparoscopic approach is safe and effective to treat TVS and should be considered as the treatment of choice.

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